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Time□	Activities□	Presenter / Person in Charge□
08.00 – 08.30	Registration	OC
08.30 – 09.00	Opening Ceremony	Prof. Dr. Dwia Aries Tina Pulubuhu, M.A. Rector of Hasanuddin University
09.00 – 09.15	Break	OC
09.15 – 10.00	Keynote Speaker 1	Dr. Ir. Jumain Appe, M.Si. Directorate of Innovation Strengthening KEMENRISTEKDIKTI
10.00 – 10.45	Keynote Speaker 2	Prof. Yoshihiro Narita JICA Academic Adviser
10.45 – 11.30	Keynote Speaker 3	Prof. Ahmad Fitriadhy Universiti Malaysia Terengganu
11.30 – 12.30	Poster Session	OC
12.30 – 13.30	Lunch Break	OC
13.30 – 15.00	Parallel session 1	Moderator
15.00 – 15.30	Break	OC
15.30 – 17.00	Parallel session 2	Moderator

Presentation Schedule
The 2nd EPI International Conference on Science and Engineering 2018 (EICSE2018)
Wednesday, 24th October 2018

Room : Lecture Theatre 1

	Time	ID	Title	Presenter
Parallel Sesion 1 (13.30 - 15.15) Moderator Muh. Ansar, ST., MT., P.hD	13.30 - 13.45	EPI1805	CFD Analysis on Prediction of Towline Tension Using Bridle Towline Configuration	Ahmad Fitriadhy, Nur Adlina Aldin, Nurul Aqilah Mansor and Nur Aqilah Hanis Zalizan
	13.45 - 14.00	EPI1806	Tidal Flood in Pekalongan: Utilizing and Operating Open Resources for Modeling	Munawir Bintang Pratama
	14.00 - 14.15	EPI1807	Prediction of Propeller Performance using Computational Fluid Dynamics (CFD) Approach	Ahmad Fitriadhy, Nur Amira Adam, Kong Wai Sheng, Faisal Mahmuddin and Cj Quah
	14.15 - 14.30	EPI1808	The Effect of Hanging Sheet Pile Breakwater's Draft Relative on Wave Transmission Coeeficient (Kt) in Irregular Wave	Chairul Paotonan, Hasdinar Umar, Ahmad Yasir Baeda, Taufiqur Rachman and Wahyuni Hasan
	14.30 - 14.45	EPI1809	Study on Sc-bearing lateritic Ni deposits in ultramafic rock from Sulawesi: A new paradigm in Indonesia metal mining industry	Adi Maulana, Sufriadin Sufriadin, Kenzo Sanematsu and Masayuki Sakakibara
	14.45 - 15.00	EPI1810	Ultimate Strength Analysis of FPSO Hull Girder under Longitudinal Bending	Muhammad Zubair Muis Alie, Risky Iriani, Juswan Juswan and Muhammad Igra Ramadhan
	15.00 - 15.15	EPI1856	Characteristics of Passengers and Vehicles Cargoes In Siwa – Lasusua Route	Misliah Idrus, Wihdat Djafar, Abd Haris Djalante, Rosmani, Gabriel Mahligai
Parallel Sesion 2 (15.30 - 17.00) Moderator Muh. Ansar, ST., MT., P.hD	**Time**	**ID**	**Title**	**Presenter**
	15.30 - 15.45	EPI1802	Investigation on Reflected Wave by Different Geometrical Ramp Shape of Overtopping Break Water for Energy Conversions using experimental and simulation	Muhammad Faris Roslan, Mohammad Fadhli Ahmad and Mohammad Azlan Musa
	15.45 - 16.00	EPI1811	Comparison of Accuracy in Extreme Learning Machine Based on Hidden Node Structure Variation for Lung Cancer Classification	Sofyan Tandungan, Indrabayu Amirullah and Ingrid Nurtanio
	16.00 - 16.15	EPI1848	Local Wisdom that forms of Bajo Ethnic Settlement in Belopa Villlage	Mukti Ali, Annisa Magfirah Ramadhani, Sri Aliah Ekawati

	16.15 - 16.30	EPI1840	Influence of Tropical Environment on Electrical Properties of Electrical Insulation Materials	S Manjang, I Kitta, Gassing, I R Sahali, F Maricar
	16.30 - 16.45	EPI1842	Hydrothermal Alteration Associated with Vein-Type Sulphide Mineralization at Lappadata Prospect, South Sulawesi, Indonesia: A Preliminary Study	Irzal Nur, Sufriadin, Asran Ilyas, Ulva Ria Irfan
	16.45 - 17.00	EPI1850	Chemical Characteristics and Correlation of Heavy Metal Elements in Lumpue Beach, Parepare City	Haerany Sirajuddin, Adi Tonggiroh

Wednesday, 24th October 2018

Room : Lecture Theatre 2

	Time	ID	Title	Authors
Parallel Sesion 1 (13.30 - 15.00) Moderator Zubair M. Alie, ST., MT., P.hD	13.30 - 13.45	EPI1815	Utilising the See-and-Follow Method for Enhancing Robot Learning Ability	Muhammad Anshar, Dicky Halim and Christoforus Yohannes
	13.45 - 14.00	EPI1816	Temperature and Salinity Gradients Analysis for a Solar Pond Prototype	Zaenab Muslimin, Indar Chaerah Gunadin, Muh. Anshar and Agus Siswanto
	14.00 - 14.15	EPI1817	Stability Improvement by Reducing Voltage Fluctuations using SVC in Penetration Wind Power System	Agus Siswanto, Indar Chaerah Gunadin, Sri Mawar Said and Ansar Suyuti
	14.15 - 14.30	EPI1818	Cloud Classification Based in Images Texture Features	Bagus Harda Setiabudi, Ingrid Nurtanio and Zahir Zainuddin
	14.30 - 14.45	EPI1819	Integration of LoRa-Cellular: Design and implementation of data communication in vehicle tracking systems	Amil Ahmad Ilham, Adnan Adnan and Randy Angriawan
	14.45 - 15.00	EPI1852	Rate of Sedimentation In Barane Beach Majene	Apriyansyah, Yusman, Abdi Manaf
	Time	**ID**	**Title**	**Authors**
Parallel Sesion 2 (15.30 - 17.00) Moderator Zubair M. Alie, ST., MT., P.hD	15.30 - 15.45	EPI1812	Environmental Sensor Design Prototype for Genset Backups Power at Ground Station and Data Centers based on Internet of Things Devices	Arif Hidayat, Panji Rachman Ramadhan, Zainuddin Zainuddin and Helmy Zainuddin
	15.45 - 16.00	EPI1813	Impact Optimal DG Placement Against Harmonic Distribution on Reconfiguration Distribution Network on Microgrid System	Muhira Faraby and Ontoseno Penangsang
	16.00 - 16.15	EPI1814	Stability Analysis and Fault Changes on Wind Turbine Effect in Multi Machine Power System	Bayu Adrian Ashad, Agus Siswanto, Indar Chaerah Gunadin and Yusran
	16.15 - 16.30	EPI1804	CFD Analysis of heave and pitch motion of the asymmetrical bridle towline model of a towed ship in waves	Ahmad Fitriadhy, Nurul Aqilah Mansor and Nur Adlina Aldin
	16.30 - 16.45	EPI1841	Insertion of 275 kV Transmission Line for Improving the Voltage Profile and Efficiency of Electrical Power System	I Kitta, S Manjang, I R Sahali, F Maricar
	16.45 - 17.00	EPI1851	Characteristic Sulfat Geochemistry of Barite (BaSO4) Marine Type on Marl Tonasa Formation Barru, South Sulawesi	Adi Tonggiroh, Meutia Farida, Haerany Sirajuddin,Desianto P Battu

Wednesday, 24th October 2018

Room : Lecture Theatre 3

	Time	ID	Title	Authors
Parallel Sesion 1 (13.30 - 15.00) Moderator Dr.Eng. Ilham Alimuddin, ST., M.GIS	13.30 - 13.45	EPI1825	Optimization of Coagulation-Flocculation Process For Tello River Water Treatment Using Poly Aluminum Chloride and Aluminum Sulfate	Setyo Erna Widiyanti
	13.45 - 14.00	EPI1826	Monthly rainfall prediction using statistical downscaling with combination of grid boxes and Adaptive Neuro Fuzzy and Inference System in Lombok	Agus Safril and Amhar Ulfiana
	14.00 - 14.15	EPI1827	Classification Of News On “Radar” Tarakan Online Using K-Nearest Neighbor Method With N-Gram Features	Evi Dianti Bintari, Gunawan and Aida Indriani
	14.15 - 14.30	EPI1828	Subsurface Investigation of Freshwater-Seawater Interface on Gowa-Takalar Coastal Aquifer, INDONESIA	Muhammad Ramli, - Purwanto and Aryanti Virtanti Anas
	14.30 - 14.45	EPI1829	Designing Board Games to Foster Tolerance	Maria Helena Suprapto, Lusia Permata Sari Hartanti and Rosalinda Latumahina
	14.45 - 15.00	EPI1821	Development a shrouded wind turbine with various diffuser type structures	Yiyin Klistafani and Muhammad Iqbal Mukhsen
	Time	**ID**	**Title**	**Authors**
Parallel Sesion 2 (15.30 - 16.45) Amil Ahmad Ilham, ST., M.IT., P.hD	15.30 - 15.45	EPI1822	Effect of Cutting Conditions on Power demand and Surface Roughness through Sustainable Turning of Mild Carbon Steel	Syah Risal, Rusdi Nur, Arthur Halik Razak and Yan Kondo
	15.45 - 16.00	EPI1823	Optimization of pouring temperatures and stirrer speed parameters on a semi-solid slurry of ADC12 Al alloy prepared by mechanical stirring	Syaharuddin Rasyid, Effendy Arif, Hairul Arsyad and Muhammad Syahid
	16.00 - 16.15	EPI1824	Effects of Work on Shock Absorber and Spiral Springs Against Vertical Loads of Vehicles Burdening the Road Structure	Simon Ka'Ka, Syukri Himran, Ilyas Renreng and Onny Sutresman
	16.15 - 16.30	EPI1843	Effect of Water Content on Uniaxial and Schmidt Hammer Pressure Strengths of Limestone and Basalt	Purwanto, Ramlan Dwi Ahmad, Ratna Husain, Busthan, Djamaluddin
	16.30 - 16.45	EPI1853	Modelling Origin Destination Trip Matrix in the Area of Northern Liukang Tupabbiring Islands Using Gravity Model	Andi Sitti Chairunnisa, M. Rizal Firmansyah, Syamsul Asri, Lukman Bochary, Zulkifli
	16.45 - 17.00	EPI1854	A Study for the Application of Steel Frames on a Traditional Wooden Fishing Boat	Lukman Bochary, Mohammad Rizal Firmansyah, Ganding Sitepu, Syamsul Asri

Wednesday, 24th October 2018

Room : Lecture Theatre 4

	Time	ID	Title	Authors
Parallel Sesion 1 (13.30 - 15.00) Moderator Dr. Indar C. Gunadin, ST., MT.	13.30 - 13.45	EPI1834	An Evaluation of Carrying Capacity of Jack-in Piles with Base Enlargement in Soft Clay	Gerard Aponno and Mochamad Sholeh
	13.45 - 14.00	EPI1845	Study on Characteristics of Maneuvering Ferry vessel as Effect Of Sea Waves	Mansyur Hasbullah, Daeng Paroka, Rosmani, and Hanisa
	14.00 - 14.15	EPI1836	Hardware and User Perspective Assessment on Application of Smart Door Access	Muhammad Anshar and Nasri Anas
	14.15 - 14.30	EPI1837	Climatic Significance of Colonial House Forms in Surabaya	I Gusti Ngurah Antaryama and Sri Nastiti Nugraheni Ekasiwi
	14.30 - 14.45	EPI1838	Design of a-based Smart Meters to Monitor Electricity Usage in the Household Sector Using Hybrid Particle Swarm Optimization - Neural Network	Muhammad Yusuf Yunus, Marhatang Marhatang, Andareas Pangkung and Muhammad Ruswandi Djalal
	14.45 - 15.00	EPI1839	Design and analysis of fixture for welding casing components of cross-flow turbine	Muas Muchtar, Syaharuddin Rasyid and Luther Sonda
	Time	**ID**	**Title**	**Authors**
Parallel Sesion 2 (15.30 - 16.45) Sabaruddin Rahman, ST., MT., P.hD	15.30 - 15.45	EPI1830	Flexural Strength Test For Concrete Beam With Mild Steel And Reinforcing Iron	Muhammad Zakaria Umar and Arman Faslih
	15.45 - 16.00	EPI1831	Sacred Spaces: Marketplace Phenomena on Historical Urban Landscape of Palopo	Moh Sutrisno, Sudaryono Sastrosasmito and Ahmad Sarwadi
	16.00 - 16.15	EPI1832	Glare from windows assessment at offices with three types of internal solar shadings	Asri Dinapradipta, Erwin Sudarma, Ima Defiana and Collinthia Erwindi
	16.15 - 16.30	EPI1833	Light Distribution Analysis on Buildings Located on The Coastal	Nurul Jamala, Ramli Rahim, Syavir Latif and Hiromi Ramli
	16.30 - 16.45	EPI1849	Study of Utilizing Banana Peel Waste as an Energy Alternative	Irwan Ridwan Rahim, Asiyanti T. Lando, Kartika Sari, Erika Asriyanti
	16.45 - 17.00	EPI1855	Standardizing Coding System for Ferry Ro Ro Ship Construction Components for Indonesian Shipyards	Mohammad Rizal Firmansyah, Syamsul Asri, Wahyuddin, Farianto Fachruddin

Effect of Cutting Conditions on Power demand and Surface Roughness through Sustainable Turning of Mild Carbon Steel

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Abstract. Sustainable turning is a lathe machining process to carry out production in particular by paying attention to the sustainability of machinery without reducing production output. The machining process is done by optimizing the turning process parameters when carrying out the cutting process on medium carbon steel. Some parameters that affect the lathe process, including rotation, feed rate, and cooling. The purpose of this study was to find the optimal machining parameter conditions to get the best results from electric power consumption and surface roughness of the medium carbon steel turning process. The research method used was experimental and analyzed using the ANOVA method. From the results of the research, it was concluded that the minimum electricity consumption was obtained in the process of turning steel St 42 without cooling with a rotation variation of 237 rpm and a loading of 0.157 mm/rev. The lower surface roughness was obtained in the turning process of St 60 steel with a rotation speed of 840 rpm and a feed rate of 0.157 mm/rev. The results of data analysis using ANOVA analysis method to get optimal conditions to get the minimum power demand and low surface roughness at 425 rpm of speed and 0.052 mm/rev of feed rate.

1. Introduction

It is a fact that the need for energy, especially electricity in Indonesia, is increasingly developing into an inseparable part of the daily needs of society along with the rapid development of technology, industry, and information. However, the implementation of electricity supply is carried out by PT. PLN (Persero), as the agency appointed by the government to manage electricity problems in Indonesia, until now still not able to meet the overall electrical energy needs. The geographical conditions of the country of Indonesia consist of thousands of islands and islands, scattered and uneven centers of electricity loads, low levels of electricity demand in several regions, high marginal costs for the development of electrical energy supply systems (Ramani KV, 1992), and limited financial capacity, are inhibiting factors for providing electricity on a national scale.

According to daily tempo news, Indonesia again received the spotlight because it was considered wasteful in energy use. This is reflected in the energy elasticity index, where Indonesia's score is higher than that of countries in Southeast Asia and even in developed countries. This was revealed in the presentation of the Directorate General of New, Renewable Energy and Energy Conservation of the Ministry of Energy and Mineral Resources at the National Energy Efficiency Conference, Monday, June 11, 2012. Indonesia's energy elasticity index has reached 1.63 higher compared to

Thailand and Singapore, which each reached 1.4 and 1.1. Even the developed countries' energy elasticity index ranges from 0.1 to 0.6. Elasticity index is a comparison of the rate of growth of energy consumption compared to the rate of economic growth, this shows the need for Indonesian people to consume energy more efficiently and reduce waste.

Savings in energy consumption are part of sustainability so that humans are able to balance their lives. Sustainability is an increasingly important need for human activities, this has led to making sustainable development a view that social, economic and environmental problems must be handled simultaneously and holistically in the development process. Sustainability has been applied in various fields, including engineering, manufacturing, and design. Producers are increasingly concerned about sustainability issues. For example, the recognition of the relationship between manufacturing operations and the natural environment has become an important factor in decision making among industrial communities (Rosen and Kishawy, 2012).

Sustainability has become an important issue in the manufacturing sector. In the literature, it is generally agreed that sustainable development must cover three pillars, namely economic, social and environmental considerations (Pusavec et al., 2010). Therefore, to achieve sustainable development, the industry must produce sustainable production. One of the ways to achieve environmentally friendly production is to reduce energy consumption through the use of products.

Sustainable production is a solution to overcome the problem of high electricity use which results in high costs. This applies to the field of engineering, including the machining process (Hanafi et al., 2012). Machinery is an integrated part of the production. Thus, reducing energy consumption during machinery will contribute to reducing energy consumption to produce parts.

Optimizing energy demand in manufacturing is important to reduce the energy intensity of products and their vulnerability to rising energy prices, this is an important addition to reducing energy costs in manufacturing and to optimize energy from machine products. Production machines are one of the most widely used production processes and require an electricity supply. Several studies have been conducted to optimize cutting conditions based on machinery and economic considerations. For example, Hinduja and Sandiford (2004) present models and methodologies for selecting optimum cutting conditions based on minimum cost considerations in the milling process. Lee and Tang (2000) developed a cutting model to maximize production levels and minimize production costs using polynomial networks.

This paper aims to determine the effect of machining parameters (rotation and feed rate) on various responses to electrical power consumption and surface roughness.

2. Experimental Design

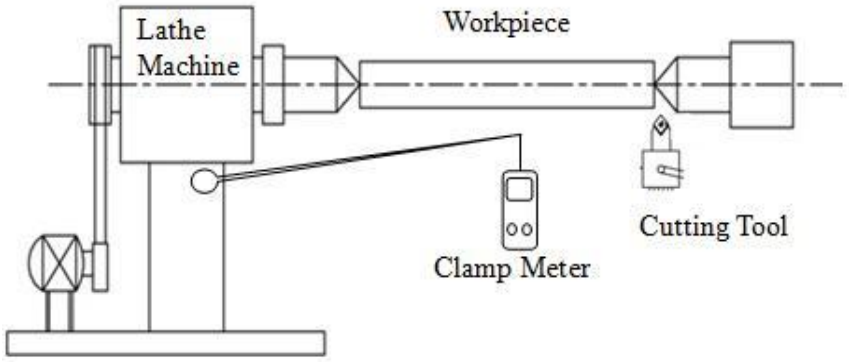
The research will be carried out in the Mechanical Workshop and Mechanical Laboratory of the Mechanical Engineering Department. In this study, the equipment used was the lathe machine (PINDAD) with a maximum power of 5620 Watt and maximum rotation of 1500 rpm.

2.1. Materials and Tools

The material being turned was medium carbon steel (Strength of 42 N/mm^2 and 60 N/mm^2). The cutting tool used was an uncoated carbide tool with type tool holder of TCLNR2020K12. Surface roughness resulting from turning can be measured by surface roughness tester (Surftest SJ-310). Power consumption can be determined by measuring voltage and current using Clamp meter.

2.2. Experimental Setup

Schematic design of the turning process on the workpiece is shown in Figure 1 below.



Gambar 1. Schematic design of the turning process

The experimental design was based on a number of machining parameters that are varied as shown in Table 1.

Table 1. Machining parameter

Levels	Low (-1)	Centre (0)	High (+1)
Rotation Speed (Vc) [rpm]	237	425	840
Feed Rate (f) [mm/rev]	0,052	0,105	0,157
Depth of cut (a_p) [mm]	0,5 mm (constant)		
Coolant	No fluid		

3. Results and Discussion

The research will be carried out in the Mechanical Workshop and Mechanical Laboratory of the Mechanical Engineering Department.

3.1. Power Demand

The power demand was obtained from the measurement data of current and voltage. It was used by the clamp meter to measure the current and voltage. The result of the power demand can be described in Figure 2.

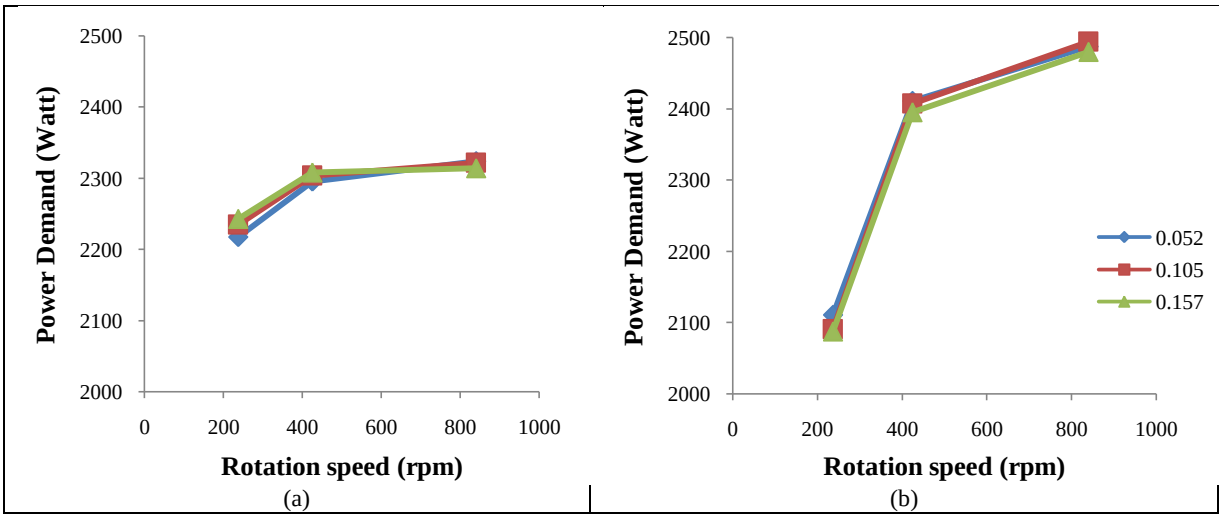


Figure 2. Graph of power demand for St 42 (a) and St 60 (b)

Based on the resulting the calculation of power demand with a variation of rotation speed and feed rate as shown in Figure 2(a), it shows that the highest power demand is 2324 Watt at 840 rpm and 0.052 rev/mm. The lowest power demand is 2217 Watt at a rotation speed of 237 rpm and the feed rate of 0.052 rev/mm. Likewise, for St 60, graph 2 (b) shows that the highest power consumption is at 840 rpm and the feed rate is 0.105 rev/mm at 2494 Watt, and conversely, the lowest power consumption is 2087 Watt at 237 rpm of speed and 0.157 rev/mm of feed rate. Some researchers observed the effect of cutting speed on power consumption in the process of turning aluminum alloy (Nur et al., 2014 and Nur et al., 2017a).

3.2. Surface Roughness

The surface roughness was measured using Surftest SJ-310 (Mitutoyo). The data of surface roughness was repeated to 5 times for each measurement. The results of surface roughness were described in Figure 3.

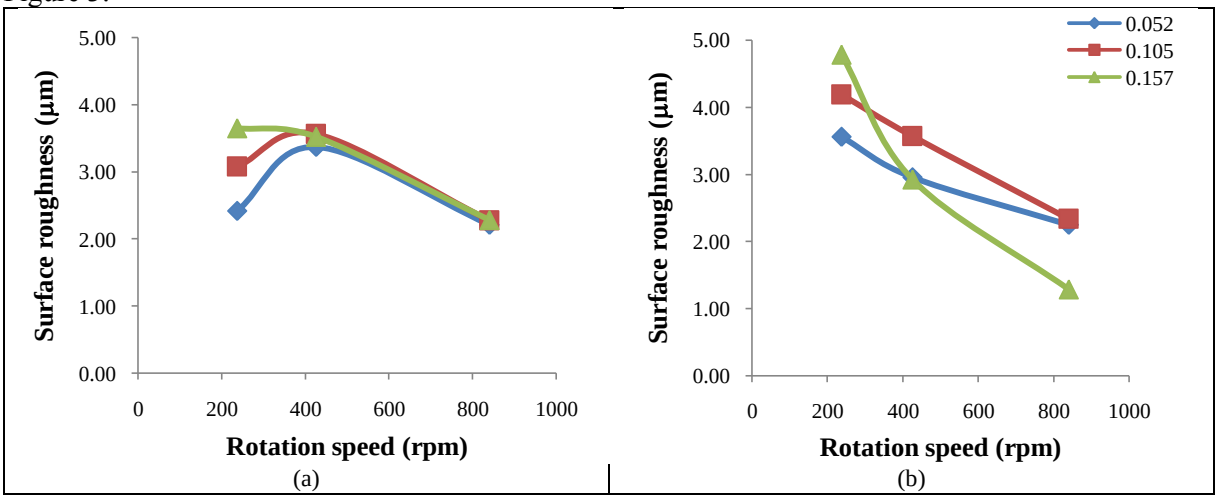


Figure 3.Graph of surface roughness for steel of St. 42 (a) and St. 60 (b)

Based on the results of the measurement of surface roughness as in Figure 3, it shows that the highest surface roughness is 3.655 µm at 237 rpm of speed and the 0.157 rev/mm of feed rate, and the lowest surface roughness is 2,215 µm at 840 rpm and 0.052 rev/mm. Likewise, on the material of St. 60, it shows that the highest surface roughness is 4.780 µm at 237 rpm and 0.157 rev/mm, and the lowest surface roughness is 1.288 µm at 840 rpm and the feed rate is 0.157 rev/mm. These responses were observed Nur et. (2017b) when turning of 316L stainless steel.

4. Conclusion

Based on the results of research and data analysis, it can be concluded as follows:

1. Power demand is only affected by the variable rotation, where the greater the rotation used, the higher the value of power demand, whereas the smaller the rotation is used, the lower the power demand. While the feed rate does not affect power demand.
2. Surface roughness is influenced by the variable rotation speed and feed rate, where a large rotation and a small in feed rate will produce a low (smooth) surface roughness. Conversely, if a small round and large feed rate will get a high surface roughness.

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